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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,763	02/08/2001	Michael A. B. Parkes	206965	4650

23460 7590 04/08/2004
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EXAMINER

ALI, SYED J

ART UNIT	PAPER NUMBER
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2127

DATE MAILED: 04/08/2004

3

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/779,763

Applicant(s)

PARKES ET AL.

Examiner

Syed J Ali

Art Unit

2127

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-29 are pending in this application.

Claim Objections

2. Claims 1, 12, 14 and 19 are objected to because of the following informalities:

In line 8 of claim 1, "refraining" should read "refraining from".

In lines 4-6 of claim 12, "each work packet corresponding to an iteration of the sub-task required for the task, each work packet containing data for performing the sub-task" should read "each work packet corresponding to an iteration of the sub-task required for the task and containing data for performing the sub-task".

In line 3 of claim 14, "is" should be deleted.

In line 3 of claim 19, "there on" should read "thereon".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 6, and 18-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the holding" in line 7.

Art Unit: 2127

Claim 1 recites the limitation "the procedure" in line 8.

Claim 19 recites the limitation "the locality" in line 9.

There is insufficient antecedent basis for these limitations in the claims.

The following claim language is indefinite:

As per claims 6 and 18, it is unclear as to whether the claims independent or dependent claims. As is, computer-readable medium claims cannot depend from a method claim.

As per claim 19, line 4 recites the limitation "the plurality". It is unclear whether this refers to "a plurality of work packets" or "a plurality of sub-tasks".

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-15, 17-20, and 22-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiffin (USPN 6,330,583) in view of Austvold et al. (USPN 6,266,708) (hereinafter Austvold) in view of Choquier et al. (USPN 5,768,515) (hereinafter Choquier).

Art Unit: 2127

As per claim 1, Reiffin teaches the invention as claimed, including a method of performing a task on a computer system, wherein the task comprises a plurality of sub-tasks (col. 4 line 60 - col. 5 line 8), the method comprising:

- (c) storing each sub-task in a holding area (col. 4 line 60 - col. 5 line 8); and
- (d) executing each of the sub-tasks while refraining executing other sub-tasks of the procedure (col. 2 lines 19-33); and
- (e) repeating steps c and d for each task until all of the tasks are completed for each request (col. 4 lines 33-40).

Austvold teaches the invention as claimed, including the following limitations not shown by Reiffin, specifically:

- (b) for each of the requests, storing in a work packet data for performing a sub-task of the task (col. 2 line 48 - col. 3 line 8).

Choquier teaches the invention as claimed, including the following limitations not shown by Reiffin or Austvold, specifically:

- (a) receiving a plurality of requests for the task (col. 2 lines 33-45);
- (d) maintaining locality of instructions and data in the cache (col. 4 line 54 - col. 5 line 3); and
- (e) repeating steps b, c, and d for each task until all of the tasks are completed for each request (col. 4 line 54 - col. 5 line 3).

It would have been obvious to one of ordinary skill in the art to combine Reiffin, Choquier, and Austvold since the methods of both Reiffin and Austvold allow for dividing a task into smaller components to ease computational burdens, but fail to account for conditions where

Art Unit: 2127

the same task (or sub-task) may be executed repeatedly, causing increased overhead by repeatedly loading the data necessary to perform those tasks. Choquier accounts for such a deficiency by maintaining information regarding an application in cache, such that processing throughput can be increased. Furthermore, Austvold teaches an exemplary model for representing tasks, such that relationships can be derived among tasks, increasing the message passing abilities such that communication among related tasks is easily achieved.

As per claim 2, Austvold teaches the invention as claimed, including the method of claim 1, wherein each sub-task has a type of work packet defined for it, wherein the work packet defined for the sub-task includes data and functions for performing the sub-task (col. 2 lines 18-47).

As per claim 3, Reiffin teaches the invention as claimed, including the method of claim 1, wherein the holding area is a queue (col. 4 line 60 - col. 5 line 8).

As per claim 4, Reiffin teaches the invention as claimed, including the method of claim 1, wherein the holding area is a stack (col. 4 line 60 - col. 5 line 8).

As per claim 5, Austvold teaches the invention as claimed, including the method of claim 1, wherein at least one of the executed work packets is a parent work packet, the method further comprising:

creating a child work packet for the parent work packet (col. 3 lines 18-45); and

Art Unit: 2127

performing a sub-task of the plurality of sub-tasks on the child work packet (col. 3 lines 18-45).

As per claim 6, Reiffin teaches the invention as claimed, including a computer-readable medium having stored thereon computer-executable instructions for performing the method of claim 1 (col. 1 lines 7-23).

As per claim 7, Austvold teaches the invention as claimed, including the method of claim 1, wherein step (b) further comprises storing in the work packet a pointer to the data for performing the sub-task (col. 24 lines 1-18).

As per claims 8-9, "Official Notice" is taken that the following would have been obvious to one of ordinary skill in the art, particularly when taken in relation to Austvold, specifically the method of claim 5, wherein the sub-task performed on the child work packet may be either different or the same as the sub-task performed on the parent work packet. That is, Austvold teaches that the parent and child packet have an inheritance relationship (col. 22 line 60 - col. 23 line 5). It is well known, especially for object-oriented systems, that when an inheritance relationship exists, the functional components of an object may either leave the parent's components intact or override them. In the former case, the data in the child would be the same as the parent, whereas in the latter case, the data would be different.

As per claim 10, Austvold teaches the invention as claimed, including the method of claim 5, wherein the sub-task being performed on the parent work packet is halted until the sub-task being performed on the child work packet is completed (col. 20 line 36 - col. 21 line 4).

As per claim 11, Austvold teaches the invention as claimed, including the method of claim 5, wherein the sub-task being performed on the parent work packet is halted until a predefined event occurs (col. 20 line 36 - col. 21 line 4).

As per claim 12, Reiffin teaches the invention as claimed, including a method of performing a task on a computer system, wherein the task comprises a plurality of sub-tasks (col. 4 line 60 - col. 5 line 8), the method comprising:

creating an instance of a stage for each sub-task, wherein the stage has an associated holding area (col. 4 line 60 - col. 5 line 8);

placing one or more sub-tasks in the holding area (col. 4 line 60 - col. 5 line 8); and

performing the sub-task on each sub-task in the holding area so that the sub-task is repeatedly performed (col. 4 lines 33-40).

Austvold teaches the invention as claimed, including the following limitations not shown by Reiffin, specifically representing sub-tasks as work packets (col. 2 line 48 - col. 3 line 8); and

each work packet corresponding to an iteration of the sub-task required for the task, each work packet containing data for performing the sub-task (col. 2 line 48 - col. 3 line 8).

Choquier teaches the invention as claimed, including the following limitations not shown by Reiffin or Austvold, specifically maintaining data locality in the cache for each sub-task (col. 4 line 54 - col. 5 line 3).

As per claim 13, Reiffin teaches the invention as claimed, including the method of claim 12, wherein the stage permits an instance of itself to be created on only a single processor in the computer system at a time (col. 4 line 60 - col. 5 line 8).

As per claim 14, Choquier teaches the invention as claimed, including the method of claim 12, wherein the stage includes a local data area, and wherein the stage regulates which processor is permitted to create an instance of it based on the part of the local data area is required to be accessed (col. 5 line 57 - col. 6 line 8).

As per claim 15, Austvold teaches the invention as claimed, including the method of claim 12, wherein for at least one of the stage instances created, there is at least one work packet that is a parent work packet, the method further comprising:

creating a child work packet for the parent work packet (col. 3 lines 18-45);

sending the child work packet to another stage instance (col. 3 lines 18-45); and

at the other stage instances, performing a sub-task of the plurality of sub-tasks on the child work packet (col. 3 lines 18-45).

As per claim 17, Austvold teaches the invention as claimed, including the method of claim 12, wherein each work packet contains at least one pointer to data for performing the sub-task (col. 24 lines 1-18).

As per claim 18, Reiffin teaches the invention as claimed, including a computer-readable medium having stored thereon computer-executable instructions for performing the method of claim 12 (col. 1 lines 7-23).

As per claim 19, Reiffin teaches the invention as claimed, including a system for executing a procedure on a computer, wherein the procedure is divided into a plurality of sub-tasks (col. 4 line 60 - col. 5 line 8), the system comprising:

a computer-readable medium having stored thereon a plurality of stages, there being at least one stage for each sub-task, each stage comprising a holding area for holding a batch of the plurality of sub-tasks (col. 40 line 60 - col. 5 line 8); and

a processor for identifying a stage of the plurality of stages and performing an iteration of the stage's sub-task on each of the batch of sub-tasks (col. 4 lines 33-40).

Austvold teaches the invention as claimed, including the following limitations not shown by Reiffin, specifically a computer-readable medium having stored there on a plurality of work packets, each work packet including data usable to perform an iteration of a sub-task of the plurality (col. 2 line 48 - col. 3 line 8).

Choquier teaches the invention as claimed, including the following limitations not shown by Reiffin or Austvold, specifically maintaining data locality in the cache for each sub-task (col. 4 line 54 - col. 5 line 3).

As per claim 20, Austvold teaches the invention as claimed, including the system of claim 19, wherein the processor is one of a plurality of processors and wherein at least one stage of the plurality is instantiated on at least two of the plurality of processors (col. 1 line 64 - col. 2 line 4).

As per claim 22, Choquier teaches the invention as claimed, including the system of claim 19, wherein the identified stage has a local data area that is divided into sections, and wherein the processor determines whether to perform the sub-task of the stage based on the section of the local data area to which each work packet of the batch will require access (col. 5 line 57 - col. 6 line 8).

As per claim 23, Austvold teaches the invention as claimed, including the system of claim 19, wherein each work packet contains instructions necessary to perform the sub-task of the stage at which it is held (col. 2 lines 18-47).

As per claim 24, Austvold teaches the invention as claimed, including the system of claim 19, wherein each work packet contains at least one pointer to instructions necessary to perform the sub-task of the stage at which it is held (col. 24 lines 1-18).

As per claim 25, Austvold teaches the invention as claimed, including the system of claim 19, wherein each stage contains instructions necessary to perform its sub-task (col. 2 lines 18-47).

As per claim 26, Reiffin teaches the invention as claimed, including the system of claim 19, wherein the holding area of each stage is one of a plurality of holding areas for the stage, and wherein each of the plurality of holding areas of a stage is associated with one of the plurality of processors (col. 4 line 60 - col. 5 line 8).

As per claim 27, Reiffin teaches the invention as claimed, including the system of claim 19, wherein the holding area is a queue (col. 4 line 60 - col. 5 line 8).

As per claim 28, "Official Notice" is taken that the following would have been obvious to one of ordinary skill in the art, specifically the system of claim 19, wherein the holding area is a priority queue. That is, methods of giving priority to tasks or sub-tasks in order to give quality of service guarantees or otherwise prioritize tasks in a queue are well known in the art. It would have been obvious to one of ordinary skill in the art to specify that the queue is a priority queue for purposes of guaranteeing certain critical tasks their necessary share of processing resources.

As per claim 29, Reiffin teaches the invention as claimed, including the system of claim 19, wherein the holding area is a stack (col. 4 line 60 - col. 5 line 8).

7. Claims 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiffin in view of Austvold in view of Choquier in view of Pase et al. (USPN 5,566,321) (hereinafter Pase).

As per claim 16, Pase teaches the invention as claimed, including the following limitations not shown by the modified Reiffin, specifically the method of claim 12, wherein the holding area includes a stack and a queue, and the method further comprises:

for each work packet received by at least one stage instance, putting the work packet in the stack if the work packet originated from the processor on which the instance of the stage is created (col. 4 lines 38-59), and putting the work packet in the queue if the work packet originated from another processor (col. 3 lines 43-47).

It would have been obvious to one of ordinary skill in the art to combine the modified Reiffin with Pase since efficient memory management facilitates parallel processing by reducing message passing overhead. The integration of shared memory in a parallel processing environment reduces the amount of message passing needed, thereby increasing the overall processing capacity of the system.

As per claim 21, Pase teaches the invention as claimed, including the system of claim 19, wherein the holding area of the identified stage includes a queue and a stack, wherein the queue is for holding work packets that originated from processors other than the one on which an instance of the identified stage is created (col. 3 lines 43-47), wherein the stack is for holding

Art Unit: 2127

work packets that originated from the processor on which the instance of the stage is created (col. 4 lines 38-59).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 5,524,242 to Aida et al. teaches processing a task in parallel by dividing it into sub-tasks.

USPN 6,230,190 to Edmonds et al. teaches repetitive execution of the same task in a networked environment.

USPN 6,496,871 to Jagannathan et al. teaches representing a task as an agent object, and executing the task as a group of sub-agents in a distributed system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (703) 305-8106. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

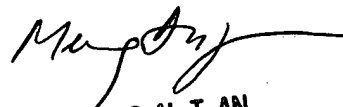
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2127

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Syed Ali
March 24, 2004



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